CURRENT STATUS OF NEWBORN HEARING SCREENING IN GENERAL HOSPITAL OF KAVALA, GREECE

Papadopoulou D.[1] , Gerostergiou E.[1]

[1] ENT Clinic, General Hospital of Kavala, Greece

OVERVIEW

Statement of the problem: The aim of this study is to investigate the epidemiology of congenital hearing impairment in newborn infants in Kavala, in the first semester of life within the Universal Newborn Hearing Screening program (UNHS). On the basis of these programs, the estimated prevalence of permanent hearing loss is 1.33 per 1,000 live births.
Methodology & Theoretical Orientation: Between January 2016 and October 2018, all healthy neonates up to six months old were screened for hearing loss via the detection and analysis of Transient Evoked Otoacoustic Emissions (TEOAEs), followed by Auditory Brainstem Response (ABR) in those who did not pass TEOAE.
Findings: A total of 423 neonates were tested 235 male and 198 female. Out of them 60 (14.18%) were asked to be retested due to ear wax within two weeks. 1 (0.24%) was diagnosed with otitis media, received treatment and passed TEOAE afterwards. 2 (0.47%) were diagnosed with secretory otitis media but no follow-up was possible in both infants. 3 (0.71%) were diagnosed with congenital hearing loss, of which 2 were bilateral. For those three infants it was recommended to use a hearing aid or undergo cochlear implantation in case the infant's hearing was not improved. Conclusion & Significance: UNHS performed in our hospital constitutes a convenient, immediate, minimally invasive mean to detect hearing impairment in early age. Therefore it is highly recommended that UNHS is compulsory to all newborns before hospital discharge from now on.

CONTACT

Evdoxia Gerostergiou
ENT Consultant, General Hospital of Kavala
Email: egerostergiou@gmail.com
Phone: 0032513501439

INTRODUCTION

Hearing impairment is one of the most frequent defects at birth, with the estimated prevalence of permanent hearing loss being 1.33 per 1,000 live births. Congenital, profound deafness is the most socially debilitating condition, as it causes serious delays in speech, language, and cognitive development. In the absence of Early Hearing Detection and Intervention (EHDI) programs, the diagnosis of profound deafness is performed too late. Recent studies on cortical plasticity during the postnatal life demonstrate that the development of the auditory cortex is affected by the absence of hearing experience. This delay prevents the children from getting good results in receptive language skill performances, educational attainment, and psycho-social development. Children with mild or moderate hearing loss are often identified even later, typically at school age. Early hearing loss detection is a key issue to decrease social impact, disability and costs associated with the disease.

The Joint Committee on Infant Hearing (JCIH) recommendations is of screening all infants, diagnosing HL within 3 months and instituting intervention within 6 months.
The aim of this study is to investigate the epidemiology of congenital hearing impairment in newborn infants in Kavala, in the first semester of life within the Universal Newborn Hearing Screening program (UNHS).

METHODS

Between January 2016 and October 2018, all healthy neonates up to six months old were screened for hearing loss via the detection and analysis of transient evoked otoacoustic emissions (TEOAEs), followed by auditory brainstem response (ABR) in those who did not pass TEOAE. Infants who did not pass due to ear wax, were advised to remove ear wax with ear drops and then repeat the test. Accordingly infants who were diagnosed with otitis media, were treated and retested. The handheld otoacoustic machine mode AccuScreen TE S/N 003374 and auditory brainstem response machine Sentiero S/N 300481 were employed. The statistic analysis was performed by using the SPSS20 program. To have reliable TEOAEs, neonates had to be at least 36 weeks old. The screened population included preterm infants (i.e., born at gestational age<37 weeks) and audiological risk factors for neonates were assessed, according to the JCIH year 2000 criteria. The study was approved by the local institutional Review Board of the General Hospital of Kavala and informed consent was obtained from the parents.



TEOAE test



ABR test



Neonate in examination

RESULTS

A total of 423 neonates were tested 235 male and 198 female. Out of them 60 (14.18%) were asked to be retested due to ear wax within two weeks. 1 (0.24%) was diagnosed with otitis media, received treatment and passed TEOAE afterwards. 2 (0.47%) were diagnosed with secretory otitis media but no follow-up was possible in both infants. 3 (0.71%) were diagnosed with congenital hearing loss, of which 2 were bilateral. For those three infants it was recommended to use a hearing aid or undergo cochlear implantation in case the infant's hearing was not improved.

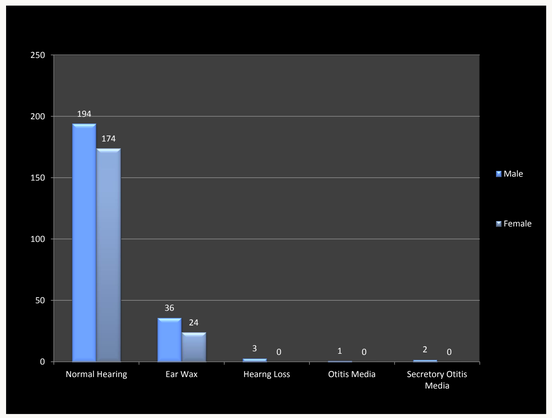


Figure 1: Preliminary results of newborn hearing screening

- *Congenital Hypothyroidism* **1:3.000**
- *Cystic fibrosis* **1:2.500**
- *Phenylketonuria* **1:10.000**
- *G6PD Deficiency* **3,2% M, 1,7% F**
- *Congenital Adrenal Hyperplasia (CAH)* **1:18.000**
- *Galactosemia* **1:50.000**

Figure 2: Prevalence of National Newborn Screening Program conditions

CONCLUSIONS

This study fortifies the need for hearing screening among all newborns in developing countries.Based on our findings from 423 neonates screened in General Hospital of Kavala, a TEOAE two-stage strategy combined to diagnostic ABR testing appears to be feasible, minimally invasive and accurate in the early detection of congenital HL. The identification of all newborns with hearing loss before age 6 months has now become an attainable realistic goal. In the past, parents and pediatricians often did not suspect a hearing loss until the age of 2-3 years, usually when speech disorder of varied severity appeared. In some cases the type of SLDs (Speech-Language Disorders) was reversible, in others though no essential difference was possible, leading to permanent impairment.

Our research has shown that a percentage of 0.71% was diagnosed with congenital hearing loss. Compared to the until now know prevalence (1,33:1.000) we cannot but notice there is a significant deviation. As demonstrated in figure 2, in our country there is a number of severe conditions all neonates are screened for. Our recommendation is that newborn hearing screening should be part of the National Newborn Screening Program. The causes are obvious; congenital HL is not as rare as once considered, whilst the diagnostic procedure is convenient, immediate and minimally invasive.

REFERENCES

1. Chibisova SS (2018) Epidemiology of hearing loss in children of the first year of life 83(4):37-42
2. Turchetta R (2018) Universal newborn hearing screening in the Lazio region, Italy 44:104
3. Pasha Z (2018) Screening of Hearing in Newborn Infants: Follw-up and Outcome After 40930 Births in Babol, Northern Iran 21(9):382-386
4. Gerostergiou E (2017) Newborn hearing screening program in general hospital of kavala, Greece, preliminary results
5. Korver A (2017) Congenital hearing loss 3:16094
6. Chung YS (2018) Current status of newborn hearing screening in the southeastern region of Korea doi: 10.4178/epih.e2018044
7. Therrell BL (2018) Newborn screening in the developing countries doi: 10.1097/MOP.0000000000000683